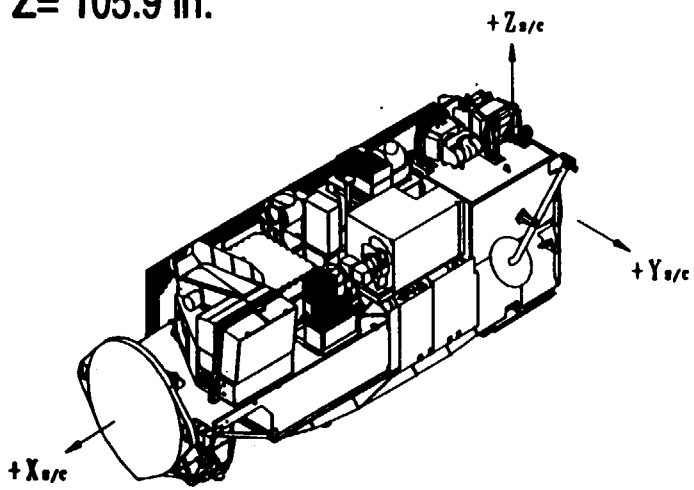
Instruments Planned for the EOS PM-1 Mission

- *Atmospheric Infrared Sounder (AIRS)*
- *Advanced Microwave Sounding Unit (AMSU)*
- *Humidity Sounder for Brazil (HSB)*
- *Moderate-Resolution Imaging Spectroradiometer (MODIS)*
- *Clouds and Earth's Radiant Energy Systems (CERES; two instruments)*
- *Advanced Microwave Scanning Radiometer (AMSR)*

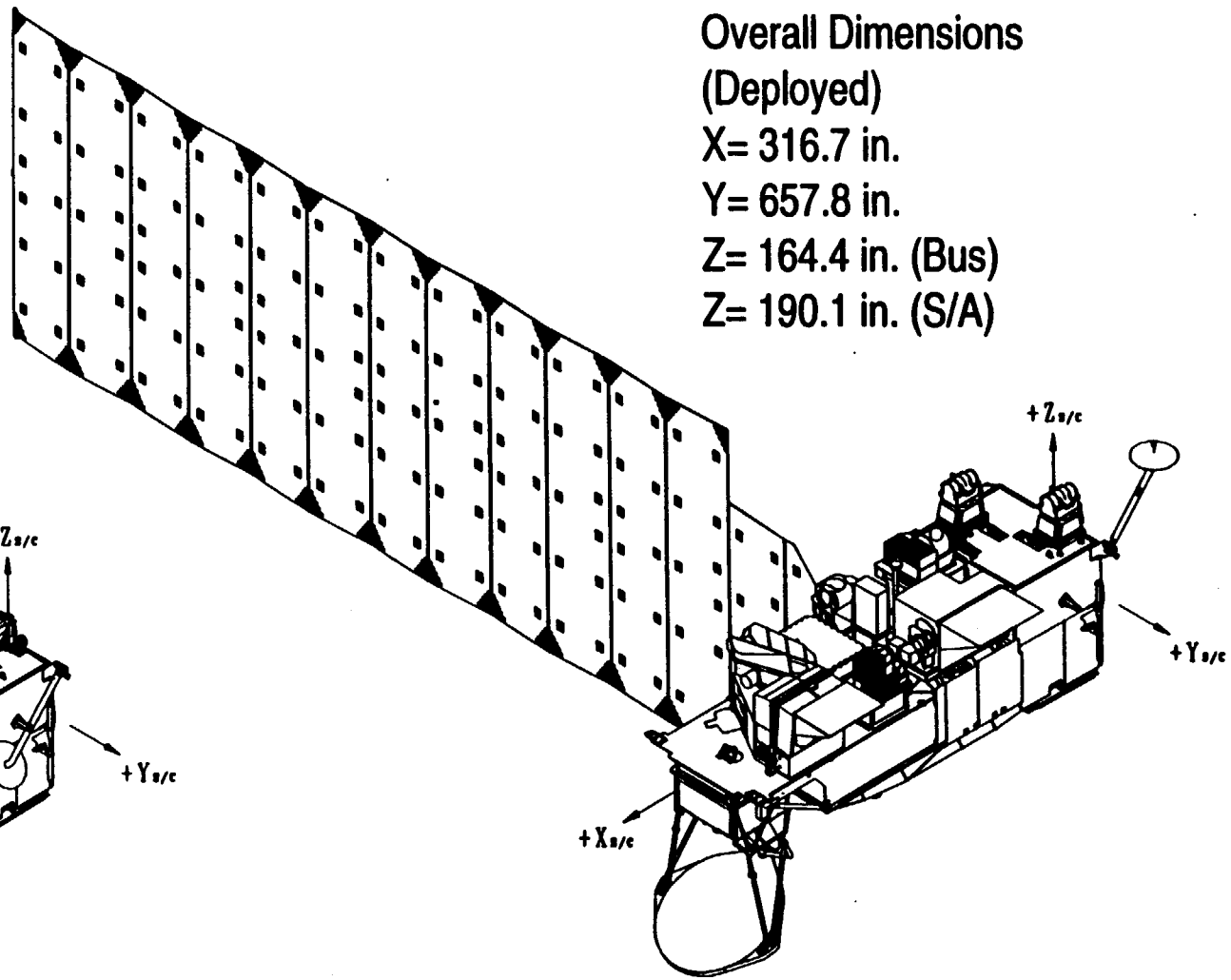
EOS PM-1

Spacecraft Configuration

Overall Dimensions
(Stowed)
X= 255.9 in.
Y= 98.1 in.
Z= 105.9 in.



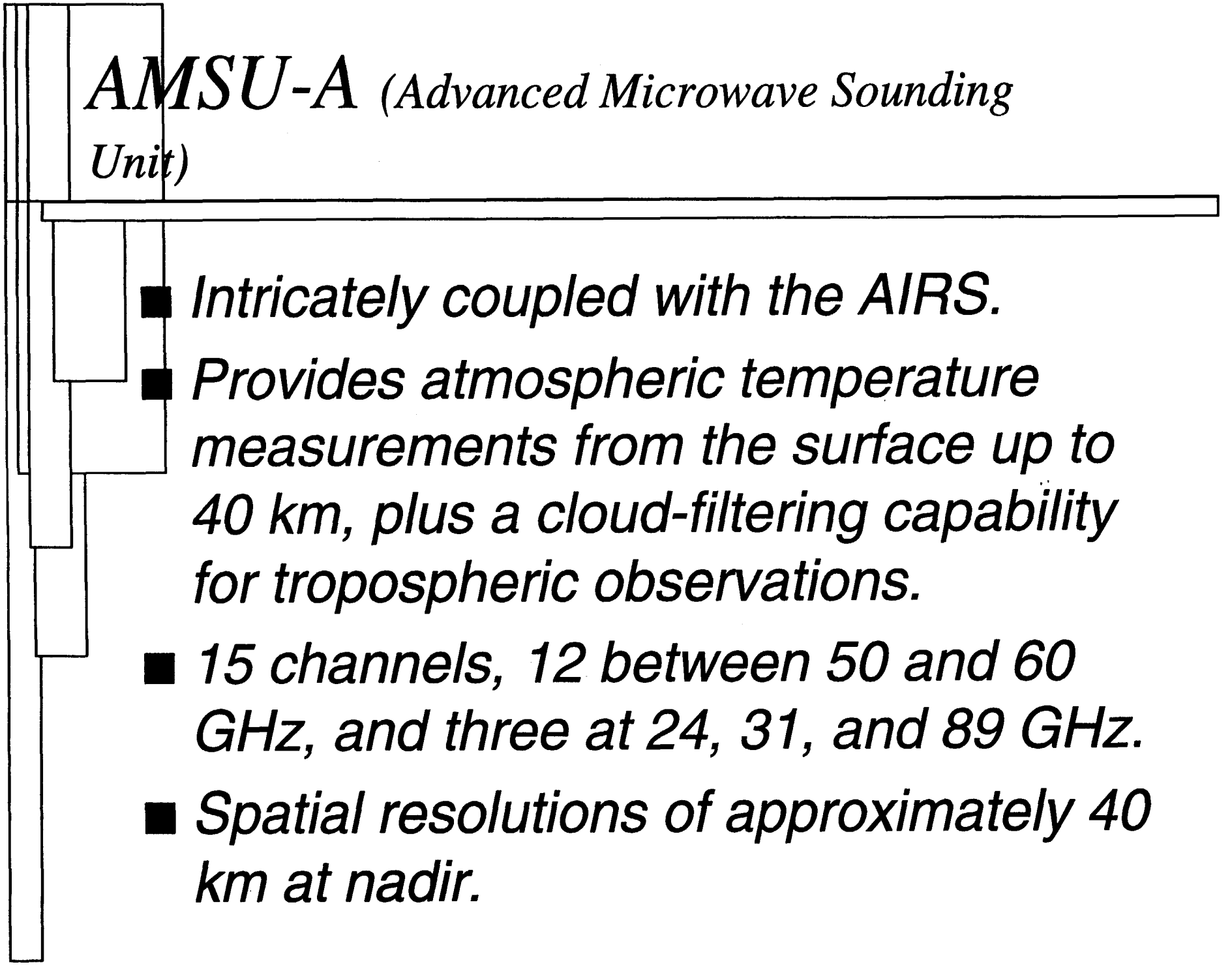
Overall Dimensions
(Deployed)
X= 316.7 in.
Y= 657.8 in.
Z= 164.4 in. (Bus)
Z= 190.1 in. (S/A)



AIRS (ATMOSPHERIC INFRARED SOUNDER)

- *Key products: atmospheric temperature and humidity profiles; land and sea surface temperatures; precipitable water; cloud cover.*
- *2,300 channels, 0.4 - 15.4 micrometers (visible and infrared).*
- *13.5 km horizontal resolution at nadir.*
- *1 km vertical resolution.*
- *Marked improvements expected in science products and weather forecasting.*

AMSU-A (Advanced Microwave Sounding Unit)



- *Intricately coupled with the AIRS.*
- *Provides atmospheric temperature measurements from the surface up to 40 km, plus a cloud-filtering capability for tropospheric observations.*
- *15 channels, 12 between 50 and 60 GHz, and three at 24, 31, and 89 GHz.*
- *Spatial resolutions of approximately 40 km at nadir.*

HSB (Humidity Sounder for Brazil)

- *Measurements of cloud liquid water, precipitation, integrated precipitable water.*
- *Needed for obtaining accurate humidity profiles under overcast conditions.*
- *Four channels: one at 150 GHz, three at 183.31 GHz.*
- *13.5-km horizontal resolution (at nadir).*
- *Needed to complete the AIRS/AMSU-A/HSB triad as a prototype operational system for NOAA.*

AMSR-E

- *All-weather, day/night, global observations of a variety of surface and atmospheric variables.*
- *The next step in the ESMR/SMMR/SSMI sequence of satellite passive-microwave radiometers.*
- *14 Channels*
  - *6.9, 10.7, 18.7, 23.8, 36.5, 89.0 GHz (H, V)*
  - *50.3, 52.8 GHz (V).*
- *Spatial resolutions ranging from 5 km (for the 89 GHz channels) to 60 km (for the 6.9 GHz channels).*

AMSR-E Data Products

- *Precipitation; water vapor; cloud liquid water.*
- *Wind speed over the ocean.*
- *Sea surface temperature.*
- *Land surface temperature.*
- *Sea ice concentration, type, and temperature.*
- *Continental snow cover.*
- *Surface soil moisture and vegetation water content.*

AIRS Science Team Highlights, FY96/97

- *Selection of the Team Algorithm for the AIRS core data products, 6/96.*
- *Completion of the first-round ATBDs, 11/96, and presentations to the review panel 3/97.*
- *Successful demonstration of the Prototype 5.0 integrated (microwave and IR) retrieval system, including ingest of simulated level 1 data and conversion to levels 1a, 1b, and the level 2 core data products, 3/97.*
- *Conclusion that the current algorithm meets the 1 K, 1 km requirement under cloudy or clear, day or night conditions, 3/97.*
- *Level 2 core algorithm update and integration into Prototype 5.0, 4/97.*

AMSR-E Science Team Highlights, FY96/97

- *Completion of the first-round ATBDs, 11/96, and presentations to the review panel 3/97.*
- *Development of an AMSR-E data simulator for algorithm testing.*
- *Intercomparison of two sea ice algorithms, followed by a decision to develop a hybrid algorithm for the AMSR-E sea ice products.*
- *Refinement of the radiative transfer model used in the calculation of SSTs and above-ocean wind speeds, water vapor, and cloud liquid water.*
- *Field experiments for soil moisture algorithms in Alabama in 1996 and for snow algorithms in Wisconsin and Wyoming in 1997.*

Spacecraft Maneuver: Science Team Positions

- *In Favor*
  - *MODIS -- Maneuvers are needed to obtain 0.3-0.5 K SST accuracies.*
  - *CERES -- Maneuvers are needed to avoid lengthy extra data processing (ERBE experience, NOAA 9 versus ERBS).*
- *Opposed*
  - *AMSR -- Each maneuver could result in a two-week data gap.*
  - *AIRS -- Maneuvers could harm the thermal stability of the instrument, etc.*